IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/678,636
Applicants	:	Peter Ernest Page et al.
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Title	:	A METHOD OF SUSPENDING, COMPLETING AND WORKING OVER A WELL
Group Art Unit	:	3672
Examiner	:	Nicole Coy Confirmation No. : 7805

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
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1. I, Paul Anthony Kelley, resident at 33 Clydesdale Street, Champion Lakes, WA 6111, Australia, am familiar with the subject matter of the above-identified application and the invention described herein ("the present invention"). I am not an inventor of the present invention.

2. I am currently employed as Completion & Well Services Manager by Woodside Energy Limited, the assignee of the above-identified application. I hold a Bachelors degree in Electronics Engineering and have worked in the oil and gas industry since 1990, including ten years working in the area of completions.

3. In paragraphs 4 to 9 below, I repeat some of the statements that I made in an earlier filed Declaration made in respect of the present invention.

4. During well completions, suspension and work-over operations, we are obliged by law to ensure that two independently verifiable barriers are in place at all times to retain control of the well. The role of each of these barriers is to stop any flow of hydrocarbons up and out through the bore of the well. Each of the first and second well control barriers has to be able to at least hold reservoir pressure applied from below the barrier.

5. It is a longstanding and well-accepted industry practice when suspending a well to position one of the two well control barriers below the anticipated depth of the lowermost end of the completion string ("the deep set plug") with the second well control barrier being placed towards an upper end of the well-bore ("the shallow plug") to ensure that the first and second well control barriers are a long way apart. In order to complete a well, the shallow plug has to be removed as it presents an obstacle to the installation of the tubing or completion string. The deep set plug is left in place until it comes time to flow the well and start production. Before removing the shallow plug, a BOP stack must be installed at the well to satisfy the statutory requirement that two independently verifiable well control barriers be in place at all times. The BOP stack has a series of shut-off valves that we can use to serve the function of the second well control barrier. When the well is completed, a plug is typically placed in the tubing hanger to allow for the removal of the BOP stack.

6. There are key drivers behind this longstanding standard industry practice of using one deep set plug and one shallow plug when suspending a well. The first driver is that the use of a shallow plug reduces the cost associated with using wireline to set or retrieve the second well control barrier. The second driver is that placement of the first and second well control barriers as far apart as possible makes it easier to independently verify the integrity of each of the two barriers.

7. Using standard industry practice, we set the deep set barrier in the well and then test that the first barrier is not leaking by filling the well-bore with a fluid and pressurising the column of fluid to a given pressure. Due to the compressibility of the fluid or entrapped gas, the pressure typically drops over a short period of time before leveling off. If the deep set barrier is leaking, the pressure does not level off and we know that remedial action must be taken. When the integrity of the deep set barrier has been verified, we run and set the shallow plug and repeat the procedure to test the integrity of the shallow barrier. Because the first and second well control barriers are placed so far apart, it is easy for us to identify which one is leaking, if this occurs.

8. The decision by the Inventors of the present invention to use two deep set barriers instead of one deep set barrier and a shallow barrier overcomes the need to remove one of the barriers prior to running the completion into the well. This in turn means that we no longer need to use the BOP stack. The Inventors use a transducer placed between the first and second deep set barriers to allow us to independently verify that both the first and the second deep set barriers are able to hold reservoir pressure. We would not be able to use two deep set barriers for well control if we were unable to independently verify their integrity.

9. The present invention is a remarkably simple idea which has significant flow-on advantages over standard industry practice in terms of time and money. The running and retrieval of a BOP stack is one of the costliest operations associated with sub-sea well construction. As a well operator, we hire the BOP equipment and the specialized vessels that deploy these BOP stacks from external third parties at an average cost of approximately USD 300,000 - 500,000 per day depending on the size and type of rig being deployed and the country in which the operation is taking place. Any procedure that allows us to reduce the costs associated with deploying a BOP stack is extremely attractive to us.

10. A well control barrier is a device that is designed to be run into the well and set in position and then released and left behind in the well to prevent the flow of hydrocarbons. In the present invention, two well control barriers are set in this way, both of them being deep-set barriers. Once the two deep set well control barriers of the present invention are run into position, they are set and released and remain in the well until the completion has been run into the well. When the time comes to retrieve the two deep set well control barriers of the present invention, they are retrieved through the tubing of the completion.

11. I have read and understood the specification filed for US patent 5,404,946 ("the Hess reference"). The borehole probe described in the Hess reference is used to take geophysical measurements for formation evaluation in an open hole or borehole. It is not a device that has been designed to work as a well control barrier in that it is not a device that has been designed to be run into the well, set, released, left behind and later retrieved after the completion has been installed. It is difficult to tell the dimensions of the inflatable packer of the Hess reference, so it is not clear to me whether or not the inflatable packer could be deflated and retrieved through the tubing after the completion has been run into the well.

12. Figure 2 of the Hess reference shows two inflatable packers (12) and (13) connected together, which are inflated using a single bidirectional packer pump (3). Electricity to run the pump (3) is provided via the logging cable (8). Once inflated, both packers rely on a single one-way check valve (22) to keep both of the packers inflated when the pump is stopped. The integrity of both inflatable packers in Figure 2 relies on the integrity of a single check valve (22). Each of the packers (12) and (13) could be considered to be a barrier to fluid flow when inflated. However, these two barriers are not independent of each other. On the contrary, if the check valve (22) fails or leaks, the integrity of both packers 12 and 13 will be lost. Similarly, failure of either of the packers (for example if one of the packers ruptured) would inevitably cause the second one to fail as well.

13. Referring to paragraphs 7 and 8 above, one of the key features of the present invention is the decision to place both of the two independently verifiable well control barriers in a "deep-set" location as this placement allows for the completion or tubing string to be run into the well with the christmas tree as a single assembly. Nothing in the Hess reference suggests that I should place the dual packer system of Figure 2 in such a way. All that the Hess reference is telling me, is that I should use two inflatable packers across an interval if I need to measure pressure and flow rates for multiple zones either side of the interval.

14. I have read and understood the specification filed for US patent 3,256,937 ("the Haeber reference"). The Haeber reference describes the use of only one deep-set barrier to maintain well control. There is no comparison between the Haeber reference and the present invention in that the present invention uses two independently verifiable deep-set barriers. It would not occur to me to replace the single barrier described in the Haeber reference with the dual packer system of Figure 2 of the Hess reference. Firstly, I would have no reason to use two barriers instead of one, because neither of these patents suggests to me that this should be done. Secondly, even if I decided to use two barriers instead of one, there is nothing in either patent to suggest to me that they should both be deep set. Thirdly, I would not chose the inflatable packer described in the Hess reference because there would be a greater risk of slippage or migration of an inflatable packer up the wellbore than there would be using the plug described in the Haeber reference. The fact that the two packers in the dual packer system are not independent of each other and fail together makes switching to the Hess system even less desirable. It is also not clear to me whether or not the deflated Hess packer can be retrieved through tubing after the completion has been run into the well.

15. I have read and understood the specification filed for US patent 7,063,157 ("the Bartlett reference"). I found this reference to be completely irrelevant to the present invention. Bartlett teaches that once the tubing hanger (48) is landed in the wellhead (20), the tubing hanger production bore (56) is sealed by a shallow

set wireline plug which is installed through the running string and the THRT (96). The wireline plug provides an additional barrier between the well bore and the environment until the christmas tree (22) is installed on the wellhead (20). Once the christmas tree (22) is installed, the shallow set wireline plug can be removed (column 4, lines 58 to 67). The wireline plug described in the Bartlett reference is not a "deep-set barrier". It would never occur to me to attempt to replace the wireline plug described in the Bartlett reference with one or more of the inflatable packers described in the Hess reference as an inflatable packer is not suited to placement in a tubing hanger production bore. Even if I did, the result is nothing like the present invention in that I would be using one deep set barrier and one shallow set barrier and still need to rely on the BOP to supplement well control.

16. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

Paul A Kelley

Paul Anthony Kelley
SPE No. 1260520
Date: 30/3/07

Witness: ROBERT LEVEY
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